(No Model.) 3 Sheets—Sheet 1.

S. PICHÉ.

PORTABLE EXTENSION LADDER.

No. 391,188. Patented Oct. 16, 1888.

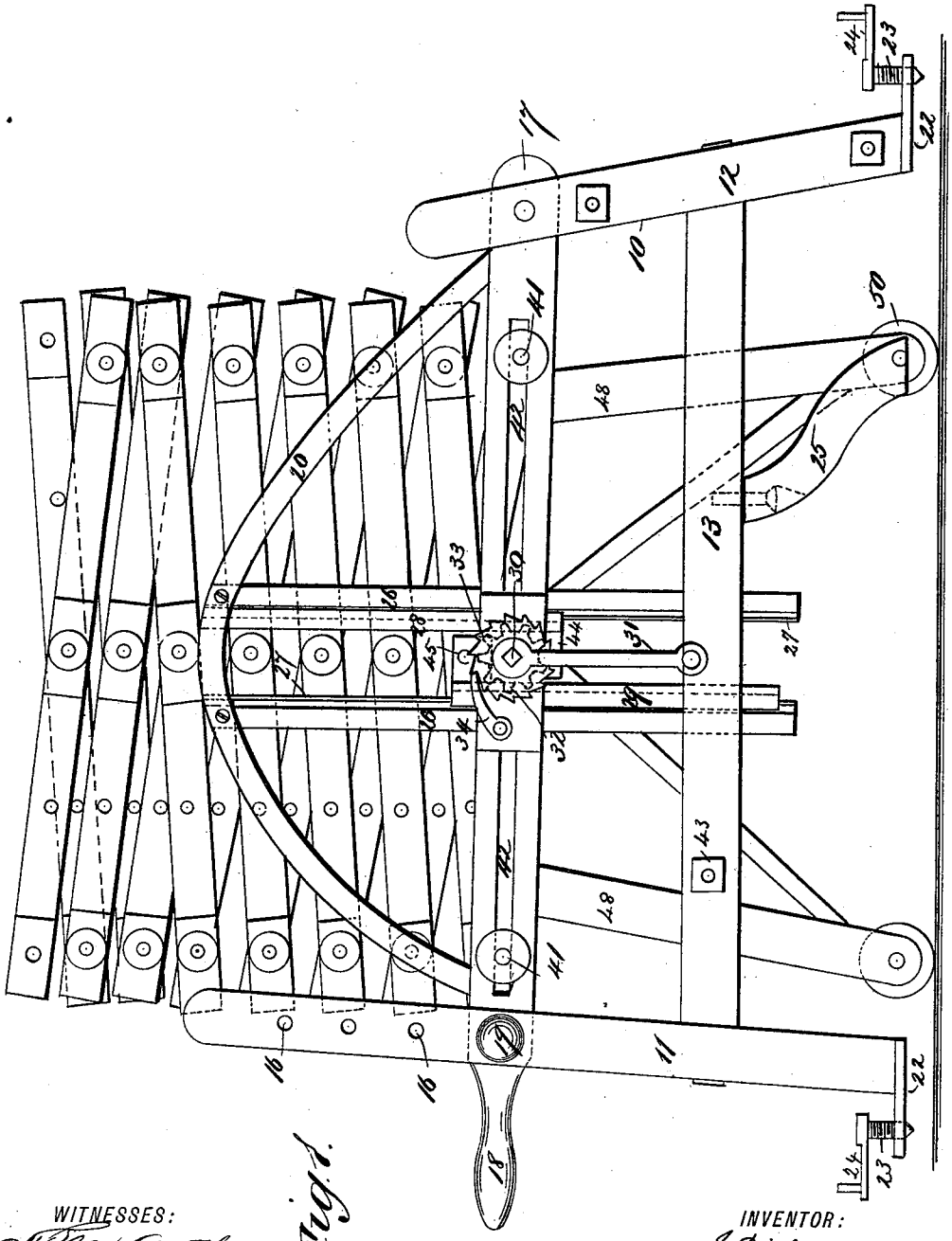


Fig. 1.

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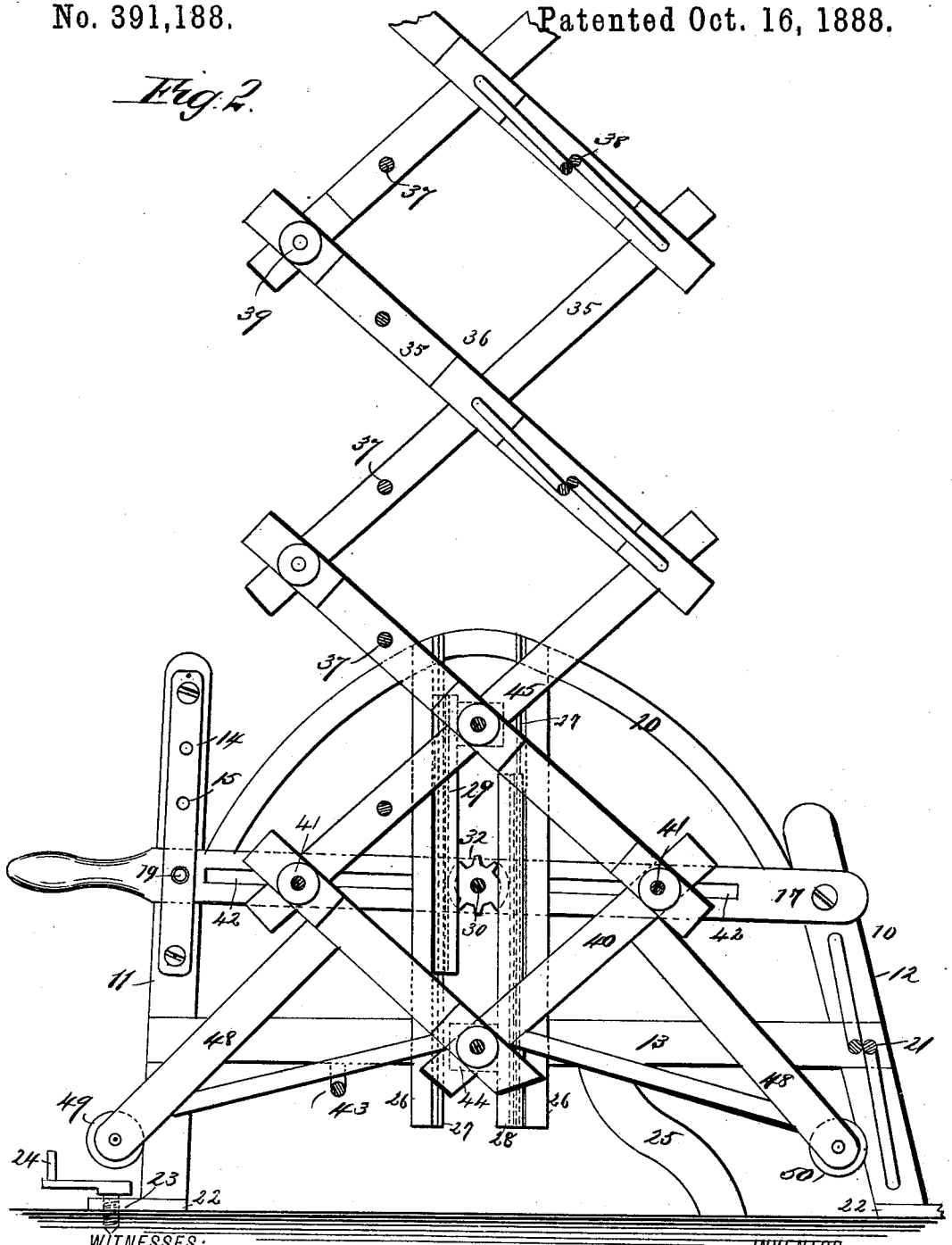
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Fig. 2.



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Fig. 3.

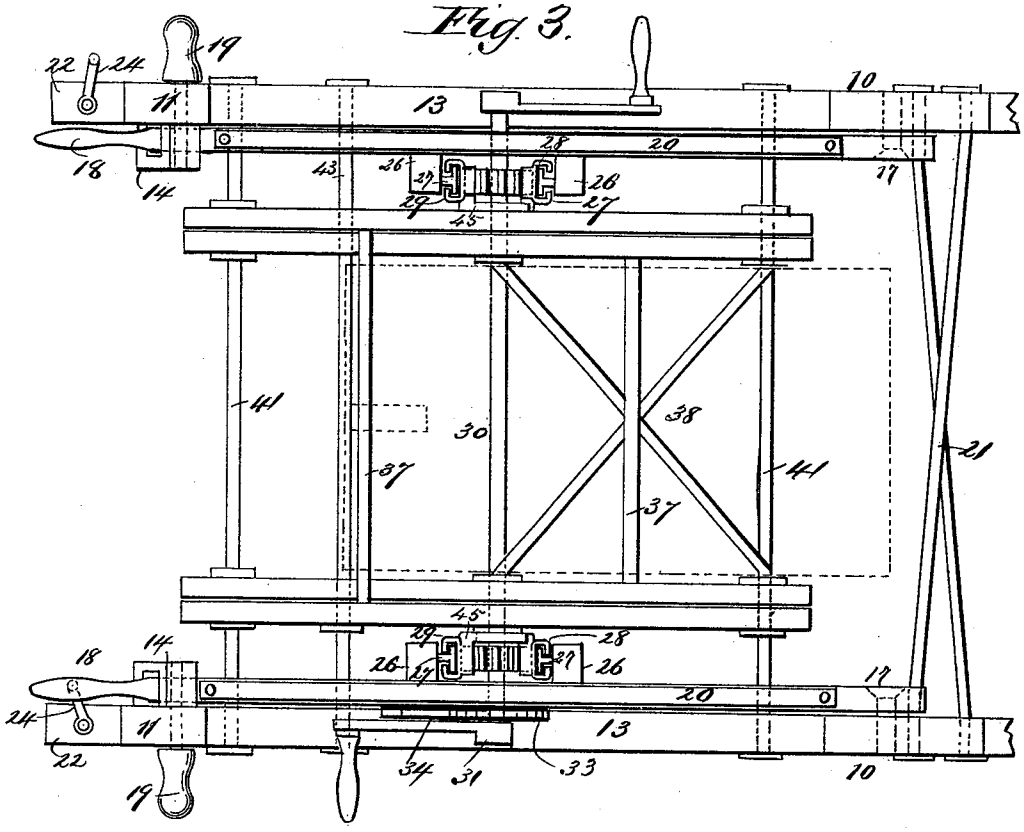
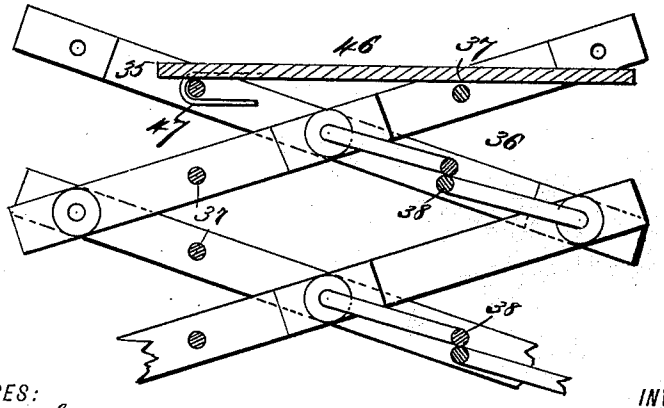


Fig. 4



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UNITED STATES PATENT OFFICE.

SIMÉON PICHÉ, OF LAKE LINDEN, MICHIGAN.

PORTABLE EXTENSION-LADDER.

SPECIFICATION forming part of Letters Patent No. 391,188, dated October 16, 1888.

Application filed July 10, 1888. Serial No. 279,572. (No model.)

To all whom it may concern:

Be it known that I, SIMÉON PICHÉ, of Lake Linden, in the county of Houghton and State of Michigan, have invented a new and Improved Portable Extension-Ladder, of which the following is a full, clear, and exact description.

My invention relates to an improvement in portable extension-ladders, and has for its object to simplify the construction of such and to provide a ladder which may be utilized as a fire-escape; and the object of the invention is also to provide a means whereby a ladder may be quickly and conveniently expanded or elevated and inclined toward a given object, and the further object is to provide an extension-ladder which will be durable, thoroughly effective, light, and capable of being readily transported from place to place.

The invention consists in the construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar figures of reference indicate corresponding parts in all the views.

Figure 1 is a side elevation of the ladder when folded down for transportation. Fig. 2 is a central vertical section of the ladder when extended. Fig. 3 is a plan view of the folded ladder; and Fig. 4 is a detail view of the upper rounds of the ladder, illustrating the application thereto of a removable platform.

In carrying out the invention the device is provided with two permanent or stationary sides, 10, which sides are parallel and consist of uprights 11 and 12, which uprights are preferably inclined from the top in direction of the bottom, and a cross-bar, 13, which cross-bar unites the said uprights, preferably below the center.

The upright 11 is longer and less inclined than the opposite upright, 12, and is provided upon the inner face with a longitudinal bracket, 14, in which bracket a series of apertures, 15, are produced longitudinally arranged, and corresponding and vertically-aligning apertures, 16, are likewise produced in the said standard 11, as illustrated in Figs. 1 and 2. At or near the upper end of each standard 12 one extremity of a horizontal lever-arm, 17, is pivoted, the opposite extremity of which lever-arm is provided with a handle, 18, and made to rest in the bracket 14. The free extremity of the lever 17 is adapted to reciprocate between the bracket and the upright 11, being held at any desired point between the bottom and top of the bracket through the medium of a pin or pins, 19, passed through the several apertures 15 and 16.

Upon the upper edge of each of the lever-arms 17 a circular beam, 20, is secured in any suitable or approved manner, the ends of which beam are attached to the lever-arm 17 within the standards 12 and 11 at or near the same, as best illustrated in Figs. 1 and 2.

The permanent sides 10 are preferably braced at the rear by diagonal brace-bars 21, secured to the respective standards 12, which brace-bars may, if found desirable, be duplicated upon the front. From the base of each standard 11 and 12 a horizontal plate, 22, is projected, in the outer end of which plate a screw, 23, is located, provided with a pointed lower extremity and a crank-arm, 24, integral or attached to the top, the purpose of which crank-arm and screw is to rigidly secure the stationary frame 10 to the ground when the ladder is elevated.

The cross-bar 13 is provided at any convenient point between the uprights 11 and 12 with a downwardly-extending arm, 25, which arm is pivoted to the under edge of the said cross-bar, the said arm being purposed to act as a stay or brace for the fixed sides of the ladder.

From the curved beams 20, at each side of the center of the same, a standard, 26, is downwardly projected, which standards are secured at their upper ends to the side of the lever-arms 17. Upon the approaching faces of the spaced vertical standards 26 a metal plate, 27, is secured, which plate is held a suitable distance from the longitudinal edge of the standards, as best shown in Fig. 1, the said plates being adapted to constitute ways, upon which rack-bars 28 and 29 are adapted to slide.

A transverse shaft, 30, is projected through the center of the lever-arms 17, which shaft has attached to each extremity a crank-arm, 31, whereby it is rotated. Upon the said shaft 30 pinions 32 are secured, one pinion adapted to engage and reciprocate the approaching

racks upon each side of the ladder-frame. Upon one extremity of the shaft 32 a ratchet-wheel, 33, is secured, which ratchet is engaged by a pawl, 34, pivoted to the outer face of one of the lever-arms 17, as best shown in Figs. 1 and 3.

The ladder proper is made up of a series of rectangular frames, 35, arranged to form a series of lazy-tongs, 36, and each frame constituting the series of lazy-tongs is provided near the forward ends with a round, 37, so arranged that when the lazy-tongs are extended or elevated, as illustrated in Fig. 2, the said rounds will be in vertical alignment. To the rear the alternate frames are braced by a series of diagonally-arranged rods, 38, which rods at one end constitute the central pivotal points of the frames, and at the other end the rear pivotal points of the same, as illustrated in Figs. 3 and 4, the said frames being pivoted at their forward ends by short pivot-pins 39.

The forward and rear ends of the first set 40 of the lazy-tongs are pivoted by a continuous bar, 41, which forward and rear bars extend beyond the sides of the lazy-tongs and travel in slots 42, produced longitudinally in the lever-arms 17 at each side of the center, as best illustrated in Figs. 1 and 3. The forward bar, 41, in this event constitutes a round of the ladder. The lower round, 43, of the ladder consists of a bar attached to the side cross-bars, 13, as best illustrated in Fig. 2. The lower end of the sliding rack 28 is attached, through the medium of a bracket, 44, to the lower end of the first set of lazy-tongs 40, as illustrated in dotted lines in Fig. 2, and the upper end of the opposite sliding rack, 27, is attached in similar manner to the center of the upper portion of the said first set of lazy-tongs, as illustrated at 45 in Fig. 2.

In operation when the shaft 32 is revolved in one direction the sliding rack 27 will be carried upward and the opposing rack 28 downward by the action of the pinions 32, which movement of the sliding racks causes the several sets of lazy-tongs to be elevated and contracted as they are carried upward. When thus elevated, by removing the pins 19 and grasping the handle 18 of the lever-arms the entire ladder, which is supported by the said lever-arms, may be inclined to the rear as far as desired. By turning the shaft 33 in a reverse direction the several sets of lazy-tongs are brought down and made to fold compactly, one upon the other, as illustrated in Fig. 1. A platform, 46, is usually provided for the top of the ladder, and to that end the upper extremities of the set of lazy-tongs are provided with two rounds in horizontal alignment, as illustrated in Fig. 4, and the platform is provided at one end with hooks 47, which hooks are adapted to encircle one of the upper rounds, the opposite end of the platform resting upon the other. Thus as one end of the platform is free, the said platform does not interfere with extension or contraction of the ladder, and, moreover, by reason of the hook-connection 47, the said platform may be readily removed, if found desirable.

From the lower set of lazy-tongs 40 a series of standards or legs, 48, are projected, two legs being provided at the front and two similar legs at the rear. The legs 48 are usually braced in any suitable manner, and the forward legs are provided with rollers or wheels 49, journaled in their lower extremities, and the two rear legs are provided with wheels 50, whereby the ladder may be guided in any direction.

When the ladder is folded down, as illustrated in Fig. 1, the legs assume an essentially perpendicular position, and the wheels are brought in contact with the ground, the rigid sides of the frame being elevated by the said legs as they are made to approach each other. When the ladder is elevated, the wheels are drawn from the ground as the legs assume an inclined position outward, as illustrated in Fig. 2, whereby the fixed frame is brought to a solid bearing upon the ground.

I desire it to be distinctly understood that I do not confine myself to the construction of the rolling support of the ladder, as the same may be varied.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a fixed frame, horizontal levers pivoted upon said frame, sliding opposing vertical racks attached to said levers, and means, substantially as described, for manipulating said racks, of a series of lazy-tongs attached to said racks, consisting of a series of pivoted frames provided near the forward end with a transverse round and diagonal brace-bars at the rear ends, said brace-bars constituting center and rear pivots, as and for the purpose specified.

2. The combination, with a fixed frame, horizontal levers pivoted upon said frame, sliding opposing vertical racks attached to said levers, and means, substantially as described, for manipulating said racks, of a series of lazy-tongs attached to said racks, consisting of a series of pivoted frames provided near the forward end with a transverse round, diagonal brace-bars at the rear ends, said brace-bars constituting center and rear pivots, a detachable platform supported upon the top rounds of the ladder, and wheel-carrying legs projected from the lower section of the lazy-tongs, all combined to operate substantially as and for the purpose specified.

3. The combination, with a fixed frame, horizontal arms projected from said frame provided with a retaining-screw, horizontal levers pivoted to said frame, an apertured bracket attached to the fixed frame, adapted to receive the free ends of the levers, vertical spaced standards secured at each side of the center of the said lever, racks sliding upon the opposing faces of said standards, and means, substantially as shown and described, for manipulating said racks, of a series of lazy-tongs attached to the sliding racks, consisting of a se-

ries of pivoted frames having a round secured in their forward ends and diagonal brace-bars at the rear, said brace-bars constituting the central and rear end pivots for the said frames, and a series of wheel-carrying legs secured to the lower section of the lower set of the said lazy-tongs, substantially as and for the purpose specified.

4. The combination, with a fixed frame, horizontal arms projected from said frame provided with a retaining-screw, horizontal levers pivoted to said frame, an apertured bracket attached to the fixed frame, adapted to receive the free end of the levers, vertical spaced standards secured at each side of the center of the said lever, racks sliding upon the opposing faces of said standards, a transverse shaft journaled in the horizontal levers, pinions carried by said shaft engaging the racks, and a ratchet-wheel and pawl connected with said shaft, of a series of lazy-tongs attached to the sliding racks, consisting of a series of pivoted frames having a round in their forward ends and diagonal brace-bars in their rear ends, which brace-bars constitute the central and rear pivots of the frame, a detachable platform supported upon the upper rounds, and guide-rods passing through the front and rear ends of the lower section of the lazy-tongs, which guide-rods slide laterally in the horizontal levers, substantially as and for the purposes specified.

5. The combination, with a fixed frame, horizontal levers pivoted to said frame, and vertically-sliding racks attached to said levers, of a lazy-tongs carried by said levers and attached to said racks, substantially as shown and described.

6. An extensible ladder consisting of lazy-tongs made up of frames, having a round in the forward end and each alternate frame provided with diagonal brace-bars which constitute the central and rear pivots of the tongs, substantially as shown and described.

SIMÉON PICHÉ.

Witnesses:
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S. S. CORNEL.